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Return to:

INSTITUTE OF GAS TECHNOLOGY

THE GAS INDUSTRY'S OWN EDUCATIONAL AND RESEARCH FACILITY

CHICAGO 16, ILLINOIS

GAS ABSTRACTS

VOLUME 8, NUMBER 9

SEPTEMBER, 1952

AFFILIATED WITH

ILLINOIS INSTITUTE OF TECHNOLOGY

CONTENTS

1. Gas Industry 165
2. Appliances 166
3. Combustion and Industrial Furnaces 166
4. Carbonization and Gasification 167
5. Natural Gas and Natural Gas Condensates 171
6. Petroleum and Synthetic Liquid Fuels 174
7. Analytical Methods and Tests 175
8. General and Physical Chemistry 177
9. Organic Chemistry 179
10. Chemical Engineering 181
11. Process Equipment and Instrumentation 182
12. Materials of Construction 184

GAS ABSTRACTS is published and distributed monthly by the Institute of Gas Technology, Chicago 16, Illinois. The contents of selected papers and patents are reviewed impartially by the editorial staff and material of potential interest to the Gas Industry is presented. Subscription rates to non-members of the Institute: $15.00 per year.—Printed in the U.S.A.

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1. GAS INDUSTRY

Canadian Oil & Gas

Nickle, C. A. OIL AND GAS AND CANADA'S ECONOMY. *Can. Gas J.*, **45**, 173-180 (1952) July.

The impact of new discoveries of oil and gas on Canada's economy is discussed. Problems involved in the exportation of Alberta gas to the U. S. Northwest are included.

J. D. Parent

Fuel Markets

Richmond, K. C. HEATING AND FUEL MARKETS: THE HOSPITAL MARKET. *Coal Heat*, **63**, 16-17, (1952) July.

A survey of 56 hospitals in Chicago and 113 hospitals in Indiana, Wisconsin and Illinois outside Chicago shows 72,440 installed boiler hp., with 20% of these using oil or gas. The average 2 or 3-boiler hospital may be assumed to use up to 1600 tons of coal/year, based on 400 bhp. average, and the 8,741 hospitals of the United States and Canada thus are estimated to consume 7 million tons coal annually.

O. P. Brysch

Gas Costs

Battersby, T. C. MEETING RISING COSTS. *Gas J.* (British),272, 783-794 (1952) June 18.

After discussing the trend of gas demands and completion with electricity in Britain, the author compares the costs of gas and electricity in the Eastern division and discusses the applications of cost accounting to production, distribution, and utilization over a number of years.

O. P. Brysch

Management–Research

Cuthrell, H. H. RESEARCH SPELLS LEADERSHIP. *Am. Gas Assoc. Monthly*, **34**, 19-20, 54-55 (1952), July-August; *Canad. Gas J.* **45**, 199-202 (1952) Aug.

The author believes that the gas industry and gas appliance manufacture need a greatly expanded research program to avoid losing ground to competitors.

J. D. Parent

Regulation of Supply

Terry, L. F. NATURAL GAS SUPPLY AND FEDERAL REGULATION. *Public Utilities Fortnightly*, **50**, 11-18 (1952) July 3.

To answer the questions, 1) Will the supply of natural gas be adequate to meet the increasing demands, and 2) Does the welfare of the consumer require Federal regulation of the gas producer, the author points out the importance of free interprise in the search for the estimated 320 trillion CF of natural gas which remains to be discovered. He believes that federal regulation would have the effect of discouraging exploratory drilling and would thereby result in reducing the supply of natural gas available to residential consumers.

A. E. Neumann

Southern Pipeline

Reed, P. EXPANSION IN THE SOUTH. *Oil Gas J.*, **51**, 44 (1952) July 21.

Southern Natural Gas Co. is planning an expansion consisting of 1,235 miles of pipe ranging in diameter from 4-1/2 to 24 inches and requiring 24,250 hp. of new compression equipment.

J. D. Parent

Unitized Operation

Landis, B. A., Jr., and Brock, L. E. FOUR CASE HISTORIES, SHOWING WHY IT PAYS TO UNITIZE. *Oil Gas J.*, **51**, 62-66 (1952) July 7.

The authors report 4 actual cases where unitization has been profitable.

J. D. Parent

Ralph, H. D. IS COMPULSORY UNITIZATION NEEDED? *Oil Gas J.*, **51**, 38-40 (1952) June 30.

It is generally agreed that most oil fields can be produced most efficiently under unitized operation. Compulsory unitization by the Federal Government is, however, abhorred. Similar compulsion by the state is also unattractive to many oil men simply on the basis of governmental interference. Oklahoma and Arkansas already require unitization on a pool-wide basis, while several states require it on the basis of a drilling unit of 10 to 80 acres.

J. D. Parent

2. APPLIANCES

Air Conditioning

MANUAL FOR THE DESIGN OF BOX-PLENUM TYPE AIR CONDITIONING DUCT SYSTEMS. Am. Gas Assoc. Committee on Domestic Gas Research Project DGR-2-AC (1952) April.

This manual describes a type of supply duct system which is as efficient as other types of trunk duct systems and less expensive. The installation and design procedure in the manual apply to residential air conditioning systems for summer, winter, or all year around operation. B. G. Lang

Pierce, H. C. THE ALL-GAS YEAR-ROUND RESIDENTIAL AIR CONDITIONER. *Refrigerating Eng.*, 60, 712-714 (1952) July.

The characteristics of operation on winter heating and summer cooling of the Servel air conditioner are described. D. L. Nicol

Broiler Burner

Buhman, C. J. and Nelson, J. A. (assigned to Cribben and Sexton Co.) GAS FUELED BROILER BURNER WITH SOLID AND FORAMINOUS FLAME BAFFLE. U.S. 2,602,497 (1952) July 8.

A method is described to increase the temperature of the heat source in a broiler for cooking without decreasing heating time. This is accomplished by the use of a flame-resistant screen adjacent to the burner to be heated by the flame gases from the burner ports. D. L. Nicol

Kinetic Burner

Abrams, V. R. (assigned to Geo. D. Roper Corp.) GAS BURNER AND FLAME DEFLECTOR. U. S. 2,587,802 (1952) March 4.

A gas burner with a unique construction that provides for a higher degree of kinetic efficiency is described. The passageway utilized in the burner head is circular and tangent to the line of entrance from the conventional mixing tube. The resulting spiral air-gas stream retains a high percentage of its original energy due to the absence of any sudden change in direction or velocity. R. A. Brown

Water Heater Control

Hastings, G. T. CONTROLS FOR GAS WATER HEATERS. *Gas Heat*, 3, 24-26, 54-55 (1952) July.

The Titan Tankmaster is a 100% shut-off type control for all fuel gases. It is a rugged and compact unit containing seven devices for automatic and safe control of water heating. B. G. Lang

3. COMBUSTION AND INDUSTRIAL FURNACES

Billet Heating

Hess, F. O. (assigned to Selas Corporation of America) METHOD AND APPARATUS FOR HEATING. U. S. 2,603,470 (1952) July 15.

A method of quick heating of large billets, blooms and the like is described. The furnace operates on the mill speed with a continuous conveyor through the furnace section. Especial claim is made for the use of natural draft to convey flue gases from the furnace through a preheating chamber. D. L. Nicol

Burner Characteristics

Waight, J. F. PROGRESS REVIEW NO. 19: GAS BURNERS. *J. Inst. Fuel* (British) 25, 118-121 (1952) May.

This article gives a comprehensive review of the advantages and disadvantages of neat-gas burners, bunsen burners, high-pressure burners, tunnel burners, premix burners and radiant-tube burners. D. L. Nicol

Catalytic Combustion

CATALYST BURNS ORGANIC VAPORS. *Chem. Eng.*, 59, 266-268 (1952) June.

The article discusses an oxidizing catalyst composed of a film of alumina and platinum alloy 0.003 in. thick on porcelain rods. Its present and future applications in eliminating obnoxious industrial vapors are outlined. H. A. Dirksen

Industrial Ovens

Maase, E. DER WAERMESCHUTZ VON INDUSTRIEOEFEN (THE HEAT LOSS OF INDUSTRIAL OVENS). *Gas- und Wasserfach*, 93, 319 (1952) June 1.

Estimates of heat loss from industrial ovens are given using heat-transfer coefficients of common ceramic materials.

C. von Fredersdorff

Industrial Heating

Hess, F. O. NEW DEVELOPMENTS IN RAPID HEATING FOR INDUSTRIAL PROCESSING. *Ind. Gas*, 30, 9-12, 24 (1952) June.

A survey of the newest methods of rapid heating is discussed. Application to newsprint and weld stress-relieving is illustrated.

D. L. Nicol

Ore Reduction

Webb, G. B. (assigned to Hydrocarbon Research, Inc.) IRON OXIDE REDUCTION. U. S. 2,598,735 (1952) June 3.

Savings on coke in iron blast-furnace operation are claimed as a result of preheating a portion of the top gas and reacting it with oxygen and coke at 1800° F. in a separate generator vessel to produce a gas rich in carbon monoxide, and recycling this (with oxygen) to the blast furnace.

O. P. Brysch

Pilot Orifices

Consterdine, C. FIXED ORIFICES FOR PREVENTION OF PILOT VALVE STOPPAGES. *Gas*, 28, 43-46 (1952) July.

Using a circular fixed aluminum orifice on appliance pilot lines is the method Pacific Gas & Electric Co. is using to reduce pilot outages.

B. G. Lang

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Broida, H. POLYHEDRAL FLAMES WITH HYDROGEN AND HYDROCARBONS. p. 178

Kistiakowsky, G. B. GASEOUS DETONATIONS. p. 177

4. CARBONIZATION AND GASIFICATION

Ammonium Sulfate

Otto, C. PRODUCTION OF AMMONIUM SULFATE. U.S. 2,599,067 (1952) June 3.

An improved ammonia recovery unit is described which utilizes a spray-tower for ammonia removal from gas, and a recirculating bath for crystal growth. Several sprays of acidified ammonium sulfate liquor are used in the tower, providing fine droplets near the gas inlet and coarse near the outlet. The supersaturated droplets from the tower drain to the crystallizing bath, in which the enlargement of crystals proceeds and from which the nelarged crystals may be withdrawn and recovered.

O. P. Brysch

Coal Ash

Edgcombe, L. J. and Manning, A. B. A SPECIAL STUDY OF ASH AND CLINKER IN INDUSTRY. PAPER I. ORIGIN AND NATURE OF ASH: SAMPLING AND ANALYSIS. *J. Inst. Fuel* (British), 25, 166-170 (1952) July.

The origin of (I) the inherent and (II) the extraneous mineral matter in coal is outlined. The sampling of coal for the determination of ash is briefly reviewed with reference to the B.S. Specifications, and methods of ash analysis and of determining the fusion temperature of the ash are described. Some correlation between ash composition and fusion temperature has been observed, but more data are required to clarify this relationship for British coals. Some discrepancy may arise between ash fusion temperatures as observed in the laboratory and the tendency of the ash to form clinker in the fuel bed; owing to the greater degree of mixing, better correlation is observed with nonstatic than with static fuel beds.

Authors' Abstract

Coal Extracts

Wynne-Jones, W. F., Blayden, H. E. and Shaw, F. THE APPARENT MOLECULAR WEIGHT AND THE COLLOIDAL NATURE OF THE PYRIDINE-SOLUBLE COAL CONSTITUENTS. (DAS SCHEINBARE MOLE-

KULARGEWICHT AND DIE KOLLOIDE NATURE DER PYRIDINLOESLICHEN KOHLEBESTANDTEILE.) *Brennstoff-Chem.* 33, (German) 201-206 (1952) June 25.

A detailed report is given on a study of the pyridine-soluble constituents of 12 South Wales and 5 Durham coals. Coals below 20% V.M. (or above 90% C) show an apparent molecular weight of extract of 400 to 500. This factor reaches a maximum of 1250 for a 31% V.M. (88% C) Durham coal. Also the yield of pyridine extract and its app. mol. wt. give very similar curves when plotted against volatile matter content of the Durham coals. Most of this variation in the extracts is due to the chloroform-insoluble portion (beta constituent), which varies considerably in yield and app. mol. wt. with the volatile matter. Electron microscopic views of dried extracts are given. The low app. mol. wts. in optically clear solutions show that the large colloidal aggregates are broken down by pyridine or by mild heating to 350° C. into truly soluble materials.
Abstr. Note — This is one of a series of 18 papers given at the Coking Coal Symposium, Techn. Hochschule Aachen, April 28-29, 1952, which are abstracted on p. 206-209 of this same issue. O. P. Brysch

Coal Oxidation Products

Roy, A. N. and Howard, H. C. SOLVENT FRACTIONATION OF POLYCARBOXYLIC ACIDS FROM OXIDATION OF COAL. *J. Am. Chem. Soc.*, 74, 3239-3242, (1952) July 5.

Polycyclic aromatic acids, obtained by the oxidation of bituminous coal, are separated on the basis of molecular weight by the solvent pair ether-pentane, and on the basis of structure by acetone-benzene mixtures. Oxidation of Pocahontos No. 3 coal in aqueous, alkaline suspension, by oxygen at 270° and 900 psig. converts 50% of the carbon to CO_2, the remainder to the organic acid mixture. Fractionation of the mixture in ether-pentane separates acids of the benzene-carboxylic series from the polycyclic and resinous acids of higher molecular weight. Partial separation of the benzene carboxylic acids into the individual components is effected by extraction with combinations of benzene and acetone. About 1/3 of the acid mixture consists of polynuclear structures, in the molecular weight range 250-450, another 1/3 of nuclei of 2 or 3 rings, in the range 200-250, and the remaining 1/3 of benzenecarboxylic acids. Of these, trimellitic acid constitutes about half, or 16% of the original mixture. Details are given for isolating and characterizing the individual acids. D. J. Dennison

Coal Solvents

Dryden, I. G. C. SOLVENT POWER FOR COALS AT ROOM TEMPERATURE. *Chem. and Ind.* (British), 502-508 (1952) June 7.

The past four years of the author's work on coal solvents is reviewed in considerable detail. The solvent effect of 55 compounds on a free-burning coal is presented. Various views on the physical chemistry of solvents, and the nature of the coal/solvent interaction are compared.
O. P. Brysch

Coke Evaluation

Campbell, R. W. A STUDY OF TESTS FOR THE EVALUATION OF COKE. *Blast Furnace and Steel Plant*, 40, 779-786, 800 (1952) July.

This article is a continuation of the AI&SI and AC&CCI. project on coke evaluation (see *Gas Abstr.* 8, 148 Aug.). The special shatter tests and tumbler tests on the coke samples from 12 plants are correlated with other coke test results and are discussed in detail. Because of the overlapping information inherent in results of a number of tests, certain ones were eliminated. The Evaluation Committee recommended the following tests: (1) Moisture (on gross + 1 in.); (2) Volatile Matter (on + 1 in.); (3) Ash (on + 1 in.); (4) Sulfur (on + 1 in.); (5) Screen (total + 2 in.); (6) Tumbler, special (+ ¼-in. after 400 revolutions); and (7) Bulk Density (on + 1 in.) O. P. Brysch

Coking Economics

Barritt, R. J. THE ECONOMICS OF COKING. *Coke and Gas* (British) 4, 180-183 (1952) May.

Economics relating to optimum size of a coking plant are dominated by labor cost (maximum number of ovens handled per man). This plus the capital cost indicates that smaller plants (below 1500 T/d) are no longer likely to be built, and because of coal supply, larger cen-

tral coking plants rather than colliery-mouth plants, will be most strategic. Because of transport cost of coal, ore, coke and steel, the location must be carefully planned by the Coal Board and the steel industry. Local sale of the coke-oven gas will have a great influence. The best integration of fuels produced by the coal, steel, town gas and oil-refinery industries will be a difficult task. O. P. Brysch

Fluidized Gasification

Riblett, E. W. (assigned to Hydrocarbon Research, Inc.) CONVERSION OF CARBONACEOUS MATERIALS. U.S. 2,600,430 (1952) June 17.

The patent relates to a combination oil cracking, coal carbonization and coal gasification operation in a system of three interconnected fluidized reactors. C. von Fredersdorff

French Coking Research

Tixier, M. C. LA PREPARATION DES CHARBONS. (COAL PREPARATION). *J. Usines Gaz*, (French) **76**, 183-187 (1952) June.

The author briefly outlines the properties and classification of coals, then lists the various standard (AFNOR) tests which are of importance in the selection of coals for carbonization. Tests of coke are reviewed, especially the T-index which is based on the mechanical resistance by the Micum drum and the bulk density. Pulverization, blending, "leaning" agents, avoidance of expansion and maintenance of uniformity in the oven charges are discussed. These techniques are applied toward improved utilization of Lorraine coal at the Carling and Thionville coke plants and the Marienau coke experiment station. O. P. Brysch

Gas Manufacture Principles

Hopton, G. U. CHEMICAL ENGINEERING PROGRESS IN THE GAS INDUSTRY. PART I. MANUFACTURE AND PURIFICATION OF GAS. *Chem. Process Eng.* (British), **33**, 179-184 (1952) April.

British gas manufacture is generally reviewed citing the individual processes and the application of engineering principle to each. The article includes a discussion on cooling and purification of manufactured gas. W. G. Bair

Hydrocarbon Gasification

Morgan, J. J. GASIFICATION OF HYDROCARBONS FOR PRODUCTION OF GASES TO SUPPLEMENT NATURAL GAS IN CITY SUPPLIES. III: PACIFIC COAST OIL GAS PROCESSES. *Gas Age*, **110**, 29-36 (1952) July 3.

A resume of the Pacific Coast oil gas processes is presented. Among items discussed are the single shell and two-shell oil gas generators, operating data, byproduct recovery and the adaption of the units as reforming units to supply a high BTU gas to augment the gas now being supplied by stand-by or peak-shaving plants. H. A. Dirksen

Morgan, J. J. GASIFICATION OF HYDROCARBONS FOR PRODUCTION OF GASES TO SUPPLEMENT NATURAL GAS IN CITY SUPPLIES. IV. REFORMING IN WATER GAS APPARATUS. *Gas Age*, **110**, 43-52 (1952) July 17.

The use of water gas apparatus is discussed with reference to a variety of processes for reforming hydrocarbon gases and vapor to meet changing demands in the gas industry as to gravity and heating value and burning characterisation. Numerous references are cited. [See also *Gas Abstracts* 8, 120, July; 149, August (1952)] H. A. Dirksen

H_2S Removal

Hollings, H. PROGRESS IN GAS PURIFICATION. Inst. Gas Eng. Communication No. 407 (1952) May, *Gas World* (British) **135**, 585-589, 594 (1952) May 31. *Gas J.* (British), **270**, 696-700 (1952) June 11.

The progress in research on H_2S removal processes is discussed. Both horizontal and vertical purifiers are being developed for use with highly active granular forms of iron oxide. A plant for the preparation of a purifying material from copperas (a byproduct of the titanium industry) and ammoniacal liquor has been designed to produce 11,000 tons/year. Sulfur of 99.83% purity is being obtained in a pilot plant employing toluene extraction of spent oxide containing 50% sulfur and 1.4% tar. The Koppers Vacuum Carbonate system is to be employed in a plant designed to reduce the H_2S content of gas from 480 to 48 gr./CCF, and the HCN content from

60 to 9 gr./ CCF. The H_2S effluent will be burned in a wet contact-acid plant. Laboratory investigations are also being conducted to improve the efficiency of the Claus kiln. C. E. Hummel

Riesenfeld, F. C., and Frazier, H. D. (assigned to The Fluor Corp., Ltd.) SEPARATION OF ACIDIC CONSTITUENTS FROM GASES. U.S. 2,600,328 (1952) June 10.

In the ethanolamine process for removing hydrogen sulfide and carbon dioxide, a solvent is used such that after the absorption the absorbing solution separates into two phases; a lower one containing substantially all of the combined carbon dioxide product (carbamate) and some hydrogen sulfide-amine reaction product; and an upper layer containing most of the combined hydrogen sulfide and no appreciable combined carbon dioxide. A substantial separation of the two gases is thus effected. D. M. Mason

Mercaptan Removal

Brown, K. M. and Gerhold, C. G. (assigned to Universal Oil Products Co.) DESULFURIZATION OF HYDROCARBON GASES. U.S. 2,598,034 (1952) May 27.

Mercaptans are extracted from a gas stream by a liquid hydrocarbon solvent. A portion of the solvent is rinsed after sweetening treatment using copper chloride. C. E. Hummel

Tar Refining

Schmalenbach, A. (assigned to Koppers Co., Inc.) CONTINUOUS DISTILLATION OF TAR. U.S. 2,594,352 (1952) April 29.

A continuous coal-tar distillation process is described, in which tar is heated in a continuous heater, vaporized as far as the pitch fraction in a separate column under 300-400 mm. Hg pressure with steam, and the vapors from this are fractionated in a bubble-cap column. In the latter the steam and vacuum are synchronized to provide fast flow and heat-transfer in the earlier steps, and a final smooth vaporization. Anthracene oil, washinf oil, naphthalene oil and phenol oil fractions are produced. Phenol-bearing water from the latter fraction is vaporized and recycled as steam into the pitch column.
O. P. Brysch

Tar Demulsification

Porter, S. C. WATER-IN-TAR EMULSIONS. Inst. Gas Eng. Commun. No. 408: *Gas World* (British), **135**, 592-593 May 31: **136**, 46-47, July 5; *Gas J.* (British) **271**, 250-257 (1952) July 30.

This article discusses coal tar-water emulsion problems generally, and also the particular problem encountered at the Ipswich gas works. Demulsification of the tar used in a 2 MMCF waterless holder was accomplished by use of "amine 220." The conclusions were: (1) each demulsification problem is unique, no connection being found between the composition of the gas in the holder and the emulsion formed, and, (2) "free carbon" is the probable emulsifying agent, and any cation-active agent which causes the emulsifier to become more wettable will be effective as a demulsifier. J. Wrozina

Tower Purifiers

Warr, R. G. and Pickering, E. T. OXIDE PURIFICATION IN TOWERS. SOME ASPECTS OF OPERATION AND CONTROL. Inst. Gas Eng. (British), Commun. No. 406 (1952) May; *Gas J.* (British), **270**, 705-8, 711, 712 (1952) June 11; *Gas World* (British), **135**, 632-637 (1952) June 14.

Difficulties in the operation of an iron-oxide tower purifier were ascribed principally to formation of a hard spent oxide layer at the point where the gas entered, and to dehydration of oxide caused by insufficient cooling. Operation has been improved by use of mixtures of new and part-spent oxide to minimize local overheating, and by introduction of steam. Results at three large plants were compared.
D. M. Mason

Steam & Gas Generator

Patterson, W. S. (assigned to Combustion Engineering-Superheater, Inc.) GAS AND STEAM GENERATOR FOR SYSTEMS FOR OBTAINING FUEL GASES AND OTHER PRODUCTS FROM NATURAL GAS AND THE LIKE. U.S. 2,603,559 (1952) July 15.

The patent relates to a combined production of steam and fuel gases in a dual generator designed to gaasify coal, natural gas and other hydro-carbonaceous materials.
C. von Fredersdorff

5. NATURAL GAS AND NATURAL GAS CONDENSATES

Ammonia Synthesis

Tuttle, H. A. PREPARATION OF CRUDE SYNTHESIS GAS FROM HYDROCARBONS. *Chem. Eng. Progress* 48, 272-275 (1952) June.

This paper develops the economic reasons for using hydrocarbon gases as a source of material for ammonia-synthesis raw gas. Thermal cracking is discussed briefly; reaction rates are given, and limitations and disadvantages of the process are pointed out. The catalytic process is discussed in more detail with stress on the function and design of the main items of equipment. Correlation of these and other auxiliary equipment is explained and their relationship shown by a flow diagram. Author's Abstract

Yeandle, W. W. and Klein, G. F. PURIFICATION OF AMMONIA SYNTHESIS GAS. *Chem. Eng. Progress*, 48, 349-352 (1952) July.

The removal of carbon oxides is discussed.
W. J. Pleticka

Carbon Black

Krejci, J. C. (assigned to Phillips Petroleum Co.) CARBON BLACK PROCESS AND APPARATUS. U.S. 2,600,994 (1952) June 17.

This invention relates to the manufacture of carbon black using special equipment.
J. D. Parent

Condensate Production

Hayes, C. W. LOW TEMPERATURE GASOLINE PLANTS. *Petroleum Eng. (Reference Annual)*, 24, C41-C46 (1952) July 15.

Estimated incomes from low temperature condensate separation plants of several types are given. J. D. Parent

Gas Conditioning

Ansell, D. W. GLYCOL SOLVES A PROBLEM. *World Oil*, 135, 238-239 (1952) July 1.

The use of diethylene glycol in a line dust-scrubber gives a satisfactory solution to the problem of excessive loss of scrubber oil due to the absorption of hydrocarbons. The average make-up of diethylene glycol is 0.034 gal/MMCF of gas scrubbed. D. C. Gami

Boehm, J. C. CONDITIONING OF NATURAL GAS. *Mech. Eng.*, 74, 563-567 (1952) July.

This article treats briefly the conditioning of natural gas. Topics discussed include: (1) dehydration; (2) removal of liquid hydrocarbons; (3) removal of H_2S; (4) removal of inert gases; (5) removal of dirt; and (6) odorization.
O. T. Bloomer

Gas Btu Control

Simms, R. K. (assigned to Phillips Petroleum Co.) MAINTAINING B.T.U. CONTENT OF RESIDUE GAS FROM ABSORBER. U.S. 2,600,133 (1952) June 10.

This invention relates to a process for recovering heavier hydrocarbons from natural gas. The gas is passed through an oil absorber where it is contacted with lean presaturated oil. The rich oil is then stripped of lighter hydrocarbon including propane in a still. These lighter hydrocarbons are then passed through a selective adsorption column for separation of pure ethane and pure propane. Some of the ethane produced is used to presaturate the lean oil and this allows control of the Btu content of the stripped gas from the absorber. The rich oil from the propane still is treated in a stripper in the conventional manner to produce butanes and gasoline. Considerable qualities of pure ethane can be produced in the process.
O. T. Bloomer

Leak Tracing

Klein, N. LEAK DETECTION WITH RADIOACTIVE TRACERS AND HALOGEN GASES IN GAS COMPRESSION CABLES AND PIPES. *Engs. Digest*, 13, 176-180 (1952) June.

So far, leaks in buried gas-compression cables have been detected and located with the help of large oxygen bubbles injected into the cable. This method is lengthy and not applicable to self-contained compression cables. New methods employing radioactive tracer gases, or halogen gases are described. These are also applicable to buried pipes and for determining the flow direction of very slowly moving gases.
Author's Abstract

LP-Gas Recovery

Deming, Ph.H. (assigned to Shell Development Co.) METHOD OF RECOVERING LIQUEFIABLE HYDROCARBONS FROM GASES. U.S. 2,601,599 (1952) June 24.

The invention relates to a method of recovering liquefiable hydrocarbons from a wet gas which occurs initially under high pressure, as for example gas from a condensate field. The gas is cooled at high pressure to a temperature in the range −650° to −130° F. The gas is then expanded to a lower pressure to produce a mixture of vapor and liquid. This mixture is processed in a fractionating column to produce a dry gas top-product and liquefied heavy hydrocarbon bottom-product. The dry gas may be liquefied, recompressed as a liquid to a high pressure, passed through heat exchange with the incoming wet gas and finally sent back to the filed for recompression or cycling operations. By varying the temperature condition the amount of ethane, propane and butane in the heavy hydrocarbon product stream may be varied over a wide range. O. T. Bloomer

Nitrogen Removal

Ferro, B. J., Jr. (assigned to Phillips Petroleum Co.) LOW-TEMPERATURE SEPARATION PROCESS. U.S. 2,600,494 (1952) June 17.

This patent relates to low temperature fractionation and specifically to production of reflux liquid by insentropic expansion of overhead vapors, so as to avoid expensive extraneous refrigeration. The application described is to liquefied natural gas under pressure. Several claims refer to the removal of nitrogen from natural gas. J. D. Parent

Gilmore, F. E. (assigned to Phillips Petroleum Co.) METHOD OF AND APPARATUS FOR SEPARATING THE CONSTITUENTS OF HYDROCARBON GASES. U.S. 2,603,310 (1952) July 15.

This invention relates to a process for separating nitrogen from natural gas and at the same time recovering as much of the ethane and heavier constituents from the gas is desired. The gas is cooled to a low temperature to condense the heavier compounds, and the uncondensed vapors are passed to an absorption tower where they are scrubbed by liquid ethane which absorbs the methane from the nitrogen residue. The rich absorption liquid is fractionated to separate the methane. O. T. Bloomer

Groebe, J. L. and Karbosky, J. T. (assigned to Phillips Petroleum Co.) TREATMENT OF GASEOUS HYDROCARBON MATERIAL STREAMS. U.S. 2,598,785 (1952) June 3.

This patent relates to a method of separating nitrogen from a natural gas high in nitrogen. The gas is compressed and cooled and then passed to a fractionating column which is refluxed with methane. The bottoms product consists of methane and heavier hydrocarbons and the top product is a mixture of methane and nitrogen, which is then separated into pure nitrogen and pure methane in a selective adsorption column. O. T. Bloomer

Odorization

Knoy, M. F. and Churchill, W. E. MEASUREMENT OF ODOR INTENSITY IN GAS UTILITY SYSTEMS. New England Gas Assoc., Operating Div., Providence, R.I. (1952) May 14.

The threshold odor concentrations, as determined by an odormeter, are reported for various points in the Boston Consolidated Gas Company system which distribute manufactured gas. Odor intensities of natural gas from several New England systems are tabulated. The desirable odor level after conversion is discussed. C. E. Hummel

Pipeline Trenches

Finn, F. N. SOIL MECHANICS IN TRENCH BACKFILLING. *Gas*, 28, 46-48 (1952) May.

A presentation is made of present day methods used in trench backfilling along with a discussion of the principles of soil mechanics as applied to trench backfilling. The need for a system of soil classification as applied to backfilling and a modification of existing specications is stressed. E. J. Pyrcioch

Pipe Line Vibration

Housner, G. W. BENDING VIBRATIONS OF A PIPE LINE CONTAINING FLOWING FLUID. *J. Applied Mechanics*, 19, 205-208 (1952) June.

Both free vibrations and forced motions due to crosswinds may create important problems in

the design of pipe lines supported above ground. An analytic investigation, based on simple beam theory, shows that the flow of fluid in such a pipe line has no beneficial effect upon the vibrations. The fluid velocity causes a dynamic coupling of the simple modes of vibration so that the normal modes of vibration are of complex shape with 90-deg out-of-phase components. The solution is presented for free vibrations and for steady-state forced vibrations, and it is shown that large amplitudes may be developed if the amount of damping is too small. It is shown that at low fluid velocities there is negligible effect upon the vibration of the pipe line, and at a certain high critical velocity the fluid flow causes a dynamic instability. The present analysis revises the conclusions which appeared in an earlier publication.

Authors' Abstract

Production

Nestle, A. C. and Radford, H. E. SELECTION OF DRILLING AND COMPLETION FLUIDS —CALIFORNIA. *Oil Gas J.*, **51**, 73-74 (1952) July 21.

A report is made on drilling and completion muds used in California. Composition, properties and cost figures are presenaed.

J. D. Parent

Pumping Economics

Stephens, J. O. LOWER UNIT COSTS ACHIEVED IN GAS TURBINE PUMPING TESTS. *Gas*, 28, 94-100 (1952) June.

Results of an economic comparison of a 1000-mile gas line powered by reciprocating engines and a similar line powered by gas turbines are presented. This study shows that somewhat lower overall pumping costs would be possible with the gas turbine driven line. Some operating data are presented on a Westinghouse 1850 hp. gas turbine operating on the Mississippi River Fuel Corp. Line. O. T. Bloomer

Underground Storage

Billue, G. H. INSTALLATION AND OPERATION OF UNDERGROUND STORAGE. PART II. *Butane-Propane News*, **14**, 69-73 (1952) July.

The following problems are encountered while installing and operating underground storage: (1) location of proper strata, (2) testing by core-drilling analysis of strata, (3) setting of production strings and drilling problems, (4) setting of circulating string and associated pipe, (5) circulating procedure, (6) testing of completed well, (7) operating procedure, (8) operating facilities, (9) operating personnel, (10) safety. [See also *Gas Abs.* 8, 152, August].

D. C. Gami

Burlingame, M. W. LARGE VOLUME STORAGE IN HERSCHER DOME APPEARS ECONOMICAL AND PRACTICAL. *Gas Age*, **109**, 26-27, 60-63 (1952) May 22.

The history and present state of development of the underground storage field being developed by Natural Gas Storage Co. of Illinois in a salt-water anticline is discussed. The dome is located near Herscher, Illinois, and may ultimately have a capacity of 90 MMCF and a peak deliverability of 1.5 MMCF/day.

O. T. Bloomer

Stephenson, C. R. UNDERGROUND GAS MEASUREMENT PROBLEMS. *World Oil* **134**, 51-253 (1952) June.

Special problems associated with the measurement of gas into and out of underground storage fields are discused. Topics discussed include meter installations where direction of flow is frequently reversed; removal of water from gas coming out of storage; and protection of the sand face of wells from compressor oil.

O. T. Bloomer

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Brenholdt, I. R. PIPE LINE CLEANER AND LOCATOR. p. 183

Clarke, L. H. EFFECT OF NUMBER OF SECTIONS ON THE ACCURACY OF AN ELECTRICAL ANALOG. p. 183

Malcolm, S. M. ANALYZING PIPE LINE NETWORKS. p. 183

6. PETROLEUM AND SYNTHETIC LIQUID FUELS

Aromatics Synthesis

Harper J. I., Olsen, J. L., and Shuman, F. R., Jr. THE AROSORB PROCESS. *Chem. Eng. Progress*, 48, 276-280 (1952) June.

A short review of the Arosorb process with a simplified flow diagram is given.

W. J. Pleticka

Desulfurization

Cines, M. R. (assigned to Phillips Petroleum Co.) SEPARATION OF SULFUR COMPOUNDS FROM HYDROCARBONS. U.S. 2,602,093 (1952) July 1.

Sulfur compounds such as mercaptans, sulfides and disulfides, are removed from liquid hydrocarbons having a narrow boiling range by azeotropic distillation using organic per-fluoro compounds (paraffins, alkyl ethers, alkylamines) as entraining agents. O. P. Brysch

Fischer-Tropsch

Frankenburg, W. G. and Layng, E. T. (assigned to Hydrocarbon Research, Inc.) CATALYTIC REDUCTION OF CARBON MONOXIDE WITH HYDROGEN. U.S. 2,600,399 (1952) June 17.

In the synthesis of hydrocarbon by the catalytic reduction of carbon monoxide and hydrogen, the patent proposes to control the formation of carbon monoxide by using feed gas composition for which the molal ratio A of hydrogen to carbon monoxide in the feed, the molal ratio G of carbon dioxide to carbon monoxide in the feed and finally the absolute temperature T of the reaction expressed in degrees Kelvin are selected in a manner that the empiric equation $\log_e (K+50) = -0.1548A - 0.1075G - 0.001512T + \log_e 279.8$ possesses a K value of at most 15, and preferably less.

H. A. Dirksen

Gas Lifting of Oil

Rhoads, B. J., Jr. GAS LIFT INSTALLATION IN THE SPRABERRY. *Petroleum Eng.*, 24, B11-B18 (1952) July.

Gas lift in the Spraberry field appears to be economical for oil production. A cost analysis is given. J. D. Parent

Hydroforming

Seebold, J. E., Bertetti, J. W., Snuggs, J. F. and Bock, J. A. FULL SCALE UNIT—FIRST TO USE THE FLUIDIZED CATALYST TECHNIQUE. *Oil Gas J.* 51, 111, 139, 135 (1952) May 19.

A general description of the hydroforming process is presented with a flow scheme of the fluid hydroformer at Destreham, La. refinery of Pan-Am Southern Corp.

W. J. Pleticka

Oil Recovery

Katz, D. L. POSSIBILITY OF CYCLING DEEP DEPLETED OIL RESERVOIRS AFTER COMPRESSION TO A SINGLE PHASE. *J. Petroleum Technology*, 4, 175-182 (1952) July.

The compressing of gas into a partially depleted gas-drive oil reservoir to bring the contents to a single phase miscible with gas is proposed as a process worthy of serious study. The compressed gas and vaporized oil would be recovered by cycling. This paper explores the possibility of recovering oil from reservoirs of 6,000 ft. or more by this method.

Author's Abstract

Kennedy, J. T. OIL RECOVERY BY L.P.G. INJECTION. *Oil Gas J.*, 51, 58-61, 69 (1952) June 30.

Injection of L.P.G. causes blending with unrecovered oil, swelling its volume and reducing its viscosity and thus increasing ease of recovery. It is felt that reservoirs of slope of 10° or more should be benefited considerably.

J. D. Parent

Reservoir Data

Murphy, J. A. GOOD DATA NECESSARY FOR GOOD RESERVOIR ENGINEERING. *World Oil*, 135, 194-200 (1952) July 1.

This is an elementary discussion of certain phases of oil reservoir engineering including interstitial water, formation volume factor and oil production mechanics.

J. D. Parent

Shale Oil

Buchan, F. E. (assigned to the United States of America CONTINUOUS PROCESS FOR THERMAL EXTRACTION OF OIL SHALE. U.S. 2,601,257 (1952) June 24.

A continuous process for the production of shale oil by thermal extraction is described.

W. J. Pleticka

Synthetic Fuels

Green, G. M., Jr. HOW MUCH OIL WE NEED AND HOW TO GET IT. *Nat. Petroleum News*, 44, 9-13 (1952) June 25.

A summary is given of the report by the President's Materials Policy (Paley) Commission. This report predicts a 110% increase in U.S. demand for oil products by 1975 but is optimistic on meeting this demand by maintaining a high level of domestic production, by increasing imports and by synthetic fuels production, first from shale and later from coal. [See also *Gas Abs.* 8, 164 (1952) August].

H. R. Linden

Schroeder, W. C. CHEMICALS, PIPELINE GAS AND LIQUID FUELS FROM COAL. *Combustion*, 23, 54-64 (1952) June.

This is a review of what has been accomplished toward the production of synthetic liquid and gaseous fuels from coal to supplement those obtained from national sources; also the use of coal as a raw material for numerous industrial chemicals. Underground gasification, developments in hydrogenation and the Fischer-Tropsch process are discussed both technologically and economically.

Author's Abstract

COAL HYDROGENATION—MORE DATA. *Chem. Eng.*, 59, 159-161 (1952) June.

A tabulated comparison of cost data for the production of gasoline and chemicals by coal hydrogenation prepared by the U.S. Bureau of Mines, the Natural Petroleum Council and Ebasco Services, Inc. is presented.

H. R. Linden

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Berti, V. PREPARATION OF AROMATIC HYDROCARBONS. p. 179

Claxton, G., BENZOLE REFINING. p. 180

Manes, M. DISTRIBUTION OF FISCHER-TROPSCH HYDROCARBONS BY CARBON NUMBER. p. 180

7. ANALYTICAL METHODS AND TESTS

Dewpoint Determination

Francis, W. E. THE MEASUREMENT OF THE DEWPOINT AND H_2SO_4 VAPOUR CONTENT OF COMBUSTION PRODUCTS. Gas Research Board Communication GRB-64 (1952) June.

A description is given of the development of apparatus and technique for the measurement of dewpoints by the electrical conductivity method, based on the increase in electrical conductivity of a glass surface which occurs on deposition of a liquid film of an electrolyte such as aqueous sulfuric acid. Using this method it is shown that the presence of a few ppm. of H_2SO_4 vapor raises the dewpoint considerably over that with water vapor alone, and that the effect of the other constituents of town gas combustion products on the dewpoint is negligible.

D. L. Nicol

Fractionation Analysis

Clothier, A. T. (assigned to Standard Oil Co.) PROCESS FOR HYDROCARBON GAS MIXTURE ANALYSIS. U.S. 2,600,158 (1952) June 10.

Gas samples containing hydrocarbons ranging from C_1 to C_5 are analyzed by distillation at pressures below 1 mm Hg.

D. M. Mason

Murphy, W. J. THE RIGHT ROAD IN ROUTINE ANALYSIS. *Anal. Chem.*, 24, 923 (1952) June.

The action of the Natural Gasoline Association of America in establishing a permanent training

school for natural gasoline plant analysts is commended. Need for standardization of fractional distillation analysis was shown by the results of a cooperative program in which 300 analyses were performed in 60 laboratories on three liquid hydrocarbon mixtures prepared from high purity hydrocarbons blended to known composition. D. M. Mason

Wood, J. F. THE TRAINING OF ANALYSTS. *Petroleum Eng.*, **24**, C41-C42 (1952) July.

The need for accuracy in the natural gasoline plant fractional analysis is illustrated by a table showing the cost involved in a 1-mm error in reading the pressure on a receiving bottle. The NGAA sponsored school for analysts is discussed. D. M. Mason

Gas Solubility

Rummel, J. K. CONTINUOUS MEASUREMENT OF DISSOLVED GASES IN WATER. Am. Soc. Testing Materials, Preprint 157 (1952).

The continuous measurement of dissolved gases in water is reviewed with special regard to selection of a method, the general methods which are available, and the application of these methods to specific gases and conditions.

D. M. Mason

Helium Determination

Frost, E. M., Jr. (assigned to the United States of America) APPARATUS AND PROCEDURE FOR THE DETERMINATION OF HELIUM IN GASES. U.S. 2,601,272 (1952) June 24.

The helium content of a natural gas sample is quantitatively determined by absorbing the non-helium components in cooled activated coconut charcoal, and measuring the pressure developed against a vacuum by aliquots of the residual helium, compressed to a specific volume. Detailed drawings of the apparatus and instructions for conducting the analysis are reported in the U.S. Bureau of Mines publication R.I. 3899 by the inventor. C. E. Hummel

Oil Ash Analysis

Hopps, G. L. and Berk, A. A. DETERMINATION OF VANADIUM IN FUEL-OIL ASH. *Anal. Chem.*, **24**, 1050-1051 (1952) June.

The standardization of a colorimetric method of determining vanadium (by phosphotungstate method) in petroleum ash is described. It is sensitive to 0.005 mg V/25 ml solution and reproducible to 0.03% in the presence of large amounts of Fe and Cr.

O. P. Brysch

Oxygen in Coal

Georgiadis, M. C. LE DOSAGE DIRECT DE L'OXYGENE DANS LES HOUILLES AMELIORATION DE LA METHODE DE SPOONER. (DIRECT DETERMINATION OF OXYGEN IN COALS BY A MODIFIED SPOONER METHOD). *J. Usines Gas*, **76**, 188-190 (1952) June.

This method for direct determination of oxygen in coals consists of decomposing the sample in a stream of nitrogen and converting the oxygenated products to carbon monoxide. This is done by passing the products of the decomposition over some carbon heated at 1150° C. The CO mixed with air then is oxidized by a catalyst. The CO_2 obtained is collected in a absorption tube and weighed. From this, the quantity of oxygen is deduced. The results are reproduceable. One hour is required for each run.

S. Sensi

Oxygen in Gases

Linford, A. MEASUREMENT OF OXYGEN CONCENTRATION IN GASES. *Coke and Gas* (British), **14**, 195-200 (1952) June.

Applications, principles, and design of magnetic type oxygen analyzers are discussed.

D. M. Mason

Phenol Determination

Soloway, S. and Wilen, S. H. IMPROVED FERRIC CHLORIDE TEST FOR PHENOLS. *Anal. Chem.*, **24**, 979-983 (1952) June.

The ferric chloride test for phenols as described in standard works on organic analysis fails in many cases. This study shows that this qualitative test can be greatly improved if carried out in organic solvents using small amounts of pyridine as an alkalinizing agent. Some of the best tests are obtained in chloroform solution, a medium which had been described previously as

giving negative results. All phenols, with some minor exceptions, give the test using these modified procedures. The chemistry of the test is discussed, showing the important role played by the solvent and an added base.

Authors' Abstract

Sulfur Determination

Mitchell, O. R. FREE SULFUR DETERMINATION REDUCED TO 15 MINUTES BY NEW METHOD. *Petroleum Refiner*, **31**, 148 (1952) June.

A rapid method for free sulfur in oils is based on the turbidimetric determination of the mercuric sulfide formed on shaking the oil with metallic mercury. D. M. Mason

Stefanović, G. and Stefanović, M. GASPARINI'S METHOD FOR THE DETERMINATION OF SULFUR IN ORGANIC SUBSTANCES BY ELECTRO-OXIDATION. *Analytica Chimica Acta*, **6**, 506-509 (1952) June.

The Gasparini method for the destruction of organic substances by electro-oxidation in nitric acid has been checked and it has been established that it could replace in all instances the classical method of Carius for the determination of sulphur in organic substances, but that it is simpler and more convenient for the serial determination of sulphur in various organic matters and substances. Authors' Abstract

Sundberg, O. E. and Royer, G. L. MICRODETERMINATION OF SULFUR USING THE GROTE COMBUSTION APPARATUS. *Anal. Chem.* **24**, 907-908 (1952) May.

Correct sulfur values on sulfanilamide (within ±0.3% of theoretical) were obtained by combustion in a temperature range from 540° to 730° C. D. M. Mason

The following articles, the abstracts for which appear on the pages indicated, are also called to your attention:

Crawford, A. R. MASS SPECTROMETER FOR SIMULTANEOUS GAS DETERMINATIONS. p. 179

Hawksley, P. G. THE PHYSICS OF PARTICLE SIZE MEASUREMENT. p. 179

8. GENERAL AND PHYSICAL CHEMISTRY

Combustion Reactions

Kistiakowsky, G. B., Knight, H. T. and Malin, M. E. GASEOUS DETONATIONS. III. DISSOCIATION ENERGIES OF NITROGEN AND CARBON MONOXIDE. *J. Chem. Physics*, **20**, 876-883 (1952) May.

Detonation velocities have been measured in mixtures of cyanogen and oxygen at several pressures and in tubes of several diameters, with a reproducibility of the order of 0.1 percent. Thermodynamic calculations of detonation velocities were carried out for several assumed heats of dissociation of nitrogen and of carbon monoxide and for several experimental conditions. Methods are described for the extrapolation of experimental velocities to the limit of an infinite plane wave in ideal gases. The comparison of these extrapolations with thermodynamic calculations gives best agreement for $D_{N_2} = 9.76$ ev and $D_{CO} = 11.11$ ev, the difference of experimental and calculated velocities averaging to 0.08 percent, with a standard deviation of 0.3 percent, which agrees with the predicted standard deviation. Several lower dissociation energies, which have been recommended on the basis of spectroscopic studies and of appearance potentials, give such poor agreement with these experimental data that they constitute very strong evidence in favor of the higher dissociation energies.

Authors' Abstract

Kistiakowsky, G. B., Knight, H. T. and Malin, M. E. GASEOUS DETONATIONS. V. NONSTEADY WAVES IN CO-O_2 MIXTURES. *J. Chem. Physics*, **20**, 994-1000 (1952) June.

The velocity of steady detonation waves in 2.5 CO-O_2 mixtures containing hydrogen agrees with the calculations of the Chapman-Jouguet theory. When all sources of hydrogen atoms are eliminated from such mixtures, much hotter shock waves must be used to initiate detonation. The detonation waves in hydrogen-free mixtures are stable but nonsteady. The velocities observed by piezoelectric pressure gauges undergo violent and not very regular fluctuations similar to, but not identical with, spinning detonations. Moving-film slit photographs show that

these fluctuations are caused by detonation fronts developing behind the forward shock, overtaking it at irregular intervals, and decaying in their stead. Similar detonation fronts are observed in delayed initiations of explosive mixtures capable of stationary detonation, but the waves upon initiation and after a few fluctuations settle into the stationary Chapman-Jouguet regime. Photographic observations show that the detonations developing behind the shock front are initially localized near the opposite walls of the cylindrical tube, while the gauge records demonstrate that the fronts of nonsteady waves are not normal to the tube axis but undergo irregular gyrations. The significance of these observations in terms of the rates of chemical reactions in shock fronts is discussed. Authors' Abstract

Compression Phenomena

Murray, F. E. and Mason, S. G. COEXISTENCE PHENOMENA IN THE CRITICAL REGION. I. THE GRAVITY EFFECT IN ETHANE FROM LIGHT SCATTERING. *Can. J. Chem.*, **30**, 550-561 (1952) July.

A method of estimating density gradients caused by gravitational compression in gases near the critical point is described. The method is based on measurements of the light-scattering coefficients. Some measurements on ethane are reported which show that appreciable density gradients exist near the critical point.

O. T. Bloomer

Electron Microscopy

Comer, J. J. and Hamm, F. A. EVALUATION OF SEVERAL TYPES OF REPLICAS. *Anal. Chem.*, **24**, 1006-1015 (1952) June.

The inherent structures, thicknesses and techquies of different types of replicas (silica and polystyrene) are discussed and compared to establish a selective point for them, according to the nature of reproduction of the fine structure of the film. Exhibition of a good set of electron micrographs substantiates the value of silica. S. Sensi

Flame Research

Broida, H. and Kane, W. POLYHEDRAL FLAMES WITH HYDROGEN AND HYDROCARBONS. *J. Chem. Physics*, **20**, 1042-1043 (1952) June.

Formation of polyhedral flames is explained by a theory of preferential diffusion.

E. F. Searight

Fluid Flow

Flood, E. A., Tomlinson, R. H. and Leger, A. E. THE FLOW OF FLUIDS THROUGH ACTIVATED CARBON RODS. III. THE FLOW OF ADSORBED FLUIDS. *Can. J. Chem.*, **30**, 389-410 (1952) May.

Total flow rate of fluids through a rod containing macro- and micropores has been developed empirically. Theoretical consideration given to this equation led to some alteration. This new equation agree qualitatively with the experimental data when applied to a carbon disk whose pore size distribution data are known. Curves plotted for flow rates against the mean fluid pressure of various liquids for both experimental and calculated data are presented.

S. Mori

Humidity Standards

Wexler, A. and Brombacher, W. G. FUNDAMENTAL TECHNIQUES FOR CALIBRATING HYGROMETERS. *Instrumentation* **5**, 25-27 (1952) June.

Various methods for providing atmospheres of known relative humidity in test chambers are briefly described. These include (1) divided blow method; (2) two temperatures (recirculation) method; (3) Pressure method (saturation at a high pressure followed by pressure expansion) and (4) vapor pressure of solutions including salts, water-sulfuric acid and water-glycerine. O. T. Bloomer

Infrared Spectrometry

Gailar, N. M. and Plyler, E. K. THE $3v3$ BANDS OF CARBON DISULFIDE AND CARBON DIOXIDE. *J. Research Nat. Bur. Standards*, **48**, 392-394 (1952) *May.*

The $3v3$ bands of carbon disulfide and carbon dioxide are described. This band of CS_2 is complex, containing two transitions from excited states and two transitions attributed to the isotopic molecule $CS^{32}S^{34}$ in addition to the pri-

mary transition 000 to 003 of CS_2[32]. A multiple reflection cell of 6-meter path length, 20-cm optics, and negligible loss of aperture is described. Molecular constants are checked for CO_2 and found for CS_2. These latter onstants are

$B = 0.1089\ cm^{-1}$, $a^3 = 0.0007\ cm^{-1}$,
$X_{33} = -5.2\ cm^{-1}$ and $X_{23} = -3.3\ cm^{-1}$

Authors' abstract

Goulden, J. D. THE USE OF DIFFRACTION GRATINGS WITH AN INFRA-RED SPECTROMETER. *J. Sci. Instruments* (British), **29**, 215-216 (1952) July.

A simple experimental arrangement is described in which a plane replica grating is used to obtain high dispersion with an infra-red spectrometer in the 3 μ region. The pre-monochromator unit for the grating spectrometer is built into the normal spectrometer radiation unit and uses the rocksalt prism of the spectrometer.

Author's Abstract

Mass Spectrometry

Crawford, A. R. MASS SPECTROMETER FOR SIMULTANEOUS MULTIPLE GAS DETERMINATIONS. U.S. 2,601,097 (1952) June 17.

A mass spectrometer capable of determining three components of a gas mixture simultaneously is described. Designed for respiratory purposes, a continuous record of the nitrogen, oxygen and carbon dioxide concentration is maintained with this instrument.

D. V. Kniebes

Lossing, F. P. and Tickner, A. W. FREE RADICALS BY MASS SPECTROMETRY. I. THE MEASUREMENT OF METHYL RADICAL CONCENTRATIONS. *J. Chem. Physics*, **20**, 907-914 (1952) May.

A modification of a mass spectrometer is described which enables the measurement of the partial pressure of methyl radicals in thermally decomposing gases. The thermal decomposition of the di-*tert*-butyl peroxide and mercury dimethyl was studied. D. V. Kniebes

Particle Size Measurement

Hawksley, P. G. THE PHYSICS OF PARTICLE SIZE MEASUREMENT: PART II. OPTICAL METHODS AND LIGHT SCATTERING. Brit. *Coal Utilization Research Assoc. Monthly*, **16**, 117-147, April, 181-209, May (1952).

A comprehensive review of the theory of light scattering from small particles is presented, as well as a description of optical methods which are used to measure particle size.

D. V. Kniebes

Spectroscopy

Potts, W. J., Jr. PURIFICATION OF HYDROCARBONS FOR USE AS SOLVENTS IN FAR ULTRAVIOLET SPECTROSCOPY. *J. Chem. Physics*, **20**, 809-810 (1952) May.

The ultraviolet transmission of four hydrocarbons, n-heptane, isopentane, 3-methylpentane and methyl-cyclohexane, are shown at various stages of purification. The particular advantages of each as a solvent in far ultraviolet spectroscopy is discussed with emphasis on the remarkable transmission of isopentane when purified. Author's Abstract

9. ORGANIC CHEMISTRY

Aromatics

Berti, V. PREPARAZIONE DI IDROCARBURI AROMATICI DA IDROCARBURI NATURALI. (PREPARATION OF AROMATIC HYDROCARBONS FROM NATURAL HYDROCARBON. *Rivista Dei Combustibili*, **6**, 225-247 (1952) April.

The present Italian demand for light hydrocarbons (benzene, toluene and xylenes) considerably exceeds the production possibilities from coal distillation. It is necessary therefore to produce aromatic compounds from petroleum fractions submitting them to thermal or thermocatalytical treatments as described in the present article. These treatments can be divided in two types:—processes carried out at low temperature and at medium and high pressure (hydroforming, platforming, houdryforming, etc.);—processes carried out at high temperature and low pressure (catarole, T.P.C., steamcracking, etc.). The gaseous paraffinic hydrocarbons (methane, ethane, propane and butane) also give aromatics at high temperatures. In the present article are reported in detail the chief

reactions that take place and the results obtained with some operations carried out. Finally the following four fundamental methods of aromatic compound extraction are described:—selective extraction in liquid/liquid phase, extraction in liquid/vapor phase, azeotropic distillation, selective adsorption.

Author's Abstract

Claxton, G. BENZOLE REFINING AND THE FUTURE. *Gas World* (British), **135**, 68-70 (1952) June 7.

Problems of refining for production of pure benzene are discussed. Close-boiling and azeotrope-forming paraffins and naphthanes are listed. Effects of presence of olefinic hydrocarbons on acid treating are shown to vary with type of olefin. Other aspects of acid treating, catalytic methods of removing sulfur compounds, and purification by crystallization are also discussed. D. M. Mason

Coal Chemicals

Guthrie, V. B. WILL COAL SUPPLY ALL AROMATICS? *Petroleum Processing*, **7**, 833-trope-forming paraffins and naphthenes are 837 (1952) June; *Chem. Eng.*, **59**, 152-158 (1952) June.

A description is given of the 300 tons/day coal hydrogenation plant at Institute, West Virginia constructed by Carbide and Carbon Chemicals Co. and the economic and raw materials supply considerations leading to the selection of this process for the manufacture of aromatics, phenols, amines and heterocyclics.

H. R. Linden

Coal Tar Bases

Coulson, E. A. and Ditcham, J. B. STUDIES IN COAL-TAR BASES. V. CONTAMINANTS OF PYRIDINE. *J. Applied Chem.*, **2**, 236-238 (1952) May.

A small amount of o-xylene was found in a refined sample of pyridine; a sample of technical-grade pyridine contained tetrahydro-thiophene. Methods for reducing the sulfur content of pyridine are described. C. E. Hummel

Ethyl Mercaptan

McCullough, J. P., Scott, D. W., Finke, H. L., Gross, M. E., Williamson, K. D., Pennington, R. E., Waddington, G. and Huffman, H. M. ETHANETHIOL (ETHYL MERCAPTANS): THERMODYNAMIC PROPERTIES IN THE SOLID, LIQUID AND VAPOR STATES. THERMODYNAMIC FUNCTIONS TO 1000° K. *J. Am. Chem. Soc.*, **74**, 2801-2804 (1952) June 5.

The thermodynamic properties of ethanethiol have been measured in the solid, liquid and vapor states over the temperature range 14 to 450° K. Values for the free energy function, heat content, entropy and heat capacity were computed on the basis of an harmonic-oscillator, rigid-rotator approximation at selected temperatures up to 1000° K. Authors' Abstract

Phenol Recovery

Cumming, A. P. and Morton, F. SOLVENT EXTRACTION OF PHENOL FROM COAL-TAR HYDROCARBONS: THE USE OF GLYCEROL, TRIETHYLENE GLYCOL AND THEIR AQUEOUS SOLUTIONS AS SOLVENTS. *J. Applied Chem.* (British) **2**, 314-323 (1952) June.

Equilibrium data required for the separation of phenol from its hydrocarbon mixture is presented for both glycerol-phenol-hydrocarbon and triethylene-glycophenol-hydrocarbon mixtures. Addition of H_2O to the second system gives an improved product. For a 1 to 1 ratio of solvent to hydrocarbons, only two stages are required to reduce the raffinate from 25% to below 0.25% phenol. S. Mori

Tetraethyl Lead

Thornton, D. P., J. PETROCHEMICALS IN TEL MANUFACTURE. *Petroleum Processing*, **7**, 846-848 (1952) June.

The production of tetraethyl lead at Ethyl Corporation's plant near Houston is described. The hydrogen and ethylene are obtained by pipeline from Port Arthur. W. J. Pleticka

Properties of Synthetics

Manes, M. THE DISTRIBUTION OF LIQUID AND SOLID FISCHER-TROPSCH HYDROCARBONS BY CARBON NUMBER. *J. Am. Chem. Soc.*, **74**, 3148-3151 (1952) June 20.

An equation has been derived for calculating the distribution by carbon number of Fischer-

Tropsch hydrocarbons, based on the assumptions that chain growth in the synthesis proceeds by stepwise addition of single carbon atoms, and that the probability of growth, a, of a given hydrocarbon chain is independent of the carbon number above C_3, although it may vary with experimental conditions. The equation relates the distribution of the liquid and solid product to a. Its applicability to relatively crude fractionation data ("gasoline," "Diesel oil" and "wax") from a wide variety of sources indicates that the approximate constancy of a, previously observed for liquid hydrocarbons, extends to waxes, and that a is a convenient parameter for characterizing the product distribution. The eventual termination of chain growth is a necessary consequence of the equation so that selective cracking of waxes need not be postulated. Author's Abstract

10. CHEMICAL ENGINEERING

Catalytic Reactor

McKinney, D. D. GAS DISENGAGING COMBINATION FOR CATALYTIC CONTACTING APPARATUS. U.S. 2,599,568 (1952) June 10.

A reactor for solid bed catalytic cracking is classified with parallel flow of feed and catalyst. A complex system of conical baffles separates fines from the product gas stream. Catalyst of the pellet type is used with size roughly fixed between 1/16" x 3/4" in. diameter.

W. G. Bair

Catalyst Regeneration

Grosse, A. V. SUPRESSING THE OXIDATION OF CO TO CO_2 IN A FIXED BED REGENERATOR. U.S. 2,600,360 (1952) June 10.

An improved method is claimed in the regeneration of the cracking catalyst whereby less heat is liberated and the product gas is predominately carbon monoxide in the carbon burn-off phase. The only difference from a standard cracker is the addition of a suppressor unit where the oxidizing air picks up a vapor mixture of a halide and a chloride of either silicon, zirconium, titanium or aluminum. This allows the formation of carbon monoxide but supresses the carbon dioxide formation; thus lowering the amount of heat generation in the cracker. S. Mori

Dust Removal

Ebner, A. J. GAS-WASHING APPARATUS. U.S. 2,600,743 (1952) June 17.

This patent describes an apparatus for washing dirty gases in which the gas is contacted with the washing liquid by the action of two impellers mounted concentrically within an involute chamber. E. J. Pyrcioch

Stevenson, T. K. APPARATUS FOR SEPARATING SOLIDS FROM CURRENTS OF GASES. U.S. 2,599,139 (1952) June 3.

The inventor claims an apparatus for the removal of solid particles from a gas stream. The separation chamber through which the particle-laden gas flows contains a series of adjustable baffles and a system of water sprays. Stack smoke treatment for removal of soot, cinders and ash particles is a particular application.

E. J. Pyrcioch

Fluidized Heat Transfer

Leva, M. and Grummer, M. A CORRELATION OF SOLIDS TURNOVER IN FLUIDIZED SYSTEMS. ITS RELATION TO HEAT TRANSFER. *Chem. Eng. Progress* 48, 307-313 (1952) June.

Vertical velocities of particles along the container wall were determined in fluidized sand and silica-gel beds. Particle velocities were then correlated in terms of quantities that are readily observed and calculated for fluidized beds. The correlation, based on the energy exchange between the fluidizing gas and the solids led to the definition of a new concept, the "interparticle" friction factor. Film coefficients of heat transfer between fluidized beds and the surroundings were analyzed and it was shown that for the type of equipment considered, film coeffcients increased with the 0.6 power of the particle velocity. A brief survey of other published data showed a similarity between various methods of correlation. Results indicated that a correlation of heat-transfer data

in terms of particle velocities should lead to a universal correlation, but before such a generalization was possible a better understanding of the effect of special equipment features on the dynamics of the particles in the charge was required. Authors' Abstract

Heat Transfer Body

Schutte, A. H. and Bolwes, V. O. (assigned to The Lummus Co., New York) HEAT TRANSFER PEBBLE. U.S. 2,600,078 (1952) June 10.

A hard, smooth, impermeable coke pebble of predetermined size is formed by the successive deposition and carbonization on a coke nucleus of many thin coatings of liquid heavy hydrocarbons. O. P. Brysch

Radiant Heating

Mekler, L. A. and Fairall, R. S. EVALUATION OF RADIANT HEAT ABSORPTION RATES IN TUBULAR HEATERS. PART I. RADIATION FROM PRIMARY SOURCES. *Petroleum Refiner*, 31, 101-107 (1952) June.

A simplified graphical approach to radiation calculations for tubular heater banks in furnace settings is given. A method is given for evaluating the effective heat transfer area or shape factor for the tube bank. W. G. Bair

Surface Temperature

Sasaki, N. and Kamada, A. A RECORDING DEVICE FOR SURFACE TEMPERATURE MEASUREMENTS. *Rev. Sci. Instruments*, 23, 261-263 (1952) June.

Three methods of surface temperature measurements using thermocouples are described where the reference-junction temperature is known and can be kept at this temperature throughout its measuring interval of time. Disturbances due to air currents jiggling the galvonometer mirror may be minimized by these methods.

S. Mori

Wall Heat Transfer

Green, L., Jr. GAS COOLING OF A POROUS HEAT SOURCE. *J. Applied Mechanics*, 19, 173-178 (1952) June.

A limiting case of solid-fluid heat transfer is examined, in which a gas passes through a porous wall of high specific surface with heat generation within the solid material. Dimensionless temperature profiles in the wall are presented in terms of the rate of heat generation, rate of flow, and thermal properties of the gas and solid. The pressure drop across the wall is approximated by using an average wall temperature and assuming isothermal conditions. Temperature profiles, pressure drops, and pumping-power/power-output ratios are calculated for the hypothetical case of a heated graphite wall cooled by helium. It is found that the thermal dependence of the gas viscosity produces a minimum in the pressure-drop versus flow-rate curve, and it appears that favorable pumping-power/power-output ratios can be obtained by the use of high pressures. The problem of temperature stability in a gas-cooled porous solid is pointed out and the need for experimental work emphasized. Use of the sweat-cooling technique for high-pressure, high-temperature ducts is suggested.

Author's Abstract

11. PROCESS EQUIPMENT AND INSTRUMENTATION

Fluidizer Control

Trainer, R. P. and Border, L. E. (assigned to Shell Development Co.) CONTROL OF FLOW OF FLUIDIZED SOLIDS. U.S. 2,601,676 (1952) June 24.

The patent describes a system of automatic controls for catalyst circulation in a conventional two-shell unit. The controls consist of two differential pressure recorder-controllers for each vessel. One controller is activated by the pressure-drop through the catalyst bed and activates the slide valve controlling flow from the vessel. The other control is activated by the pressure-drop across the control valve and activates a valve which controls the gas flow from the vessel concerned. The controls interlock in such manner that when the pressure-drop across the fluid bed decreases the gas flow valve is throttled, thereby increasing the vessel top-

pressure and increasing the drop across the fluid bed. The inventors claim the system eliminates reversals and blow back, thus reducing construction costs by eliminating long standpipes and allowing the plant to be built closer to the ground. W. G. Bair

Impact Pulverizer

Thomas, W. A. (assigned to Blaw-Knox Co.) FLUID IMPACT PULVERIZER. U.S. 2,602,595 (1952) July 8.

An impact pulverizer for solid particles using steam as the motive fluid is described in this patent. Provision is made for preliminary removal of fines from the feed material, for the separation and removal of the particles which have been reduced to the desired fineness, and for the return of the oversize particles for further grinding. E. J. Pyrcioch

Large Orifice Meters

Resen, F. L. ORIFICE-METER COEFFICIENTS FOR LARGE-DIAMETER LINES. *Oil Gas J.*, 51, 288-292 (1952) July 2.

The joint committee of the AGA and ASTM is determining orifice meter coefficients for 30″ diameter meter-tubes near Refugio, Texas. This article describes the test set-up. Coefficients are to be determined by metering the gas with eight parallel 10″ meter tubes. O. T. Bloomer

Network Analyzers

Clarke, L. H. THE EFFECT OF THE NUMBER OF SECTIONS ON THE ACCURACY OF A PARTICULAR RC ELECTRICAL ANALOGUE. *Australian J. Applied Sci.*, 3, 119-124 (1952) June.

The use of an RC electrical analogue with lumped constants is examined for investigating certain errors in a dynamic method of measuring thermal constants. A mathematical analysis of the multisection analogue shows that more than 20 sections are necessary to obtain the required accuracy over the time interval of interest in the thermal experiment. It is concluded that an analogue requiring so many sections is not economical because of the necessity of obtaining a large number of condensers with very high leakage resistances. Author's Abstract

Malcolm, S. M. ANALYZING PIPE LINE NETWORKS. *Heating, Piping and Air Conditioning*, 24, 100-103 (1952) July.

A review is given of the methods of analyzing pipeline networks with special emphasis on the non-linear electric analogy method. Mathematical methods, physical models, and electrical analogies for analyzing distribution problems are described. B. E. Hunt

McIlroy, M. S. ANALYZING PIPE LINE NETWORKS. *Heating, Piping and Air Conditioning*, 24, 100-103 (1952) July.

A review of the history of methods of pipeline network analysis and a description and discussion of the general features of the nonlinear electrical-analogy method is presented. A table comparing the different methods of analysis is included. R. A. Brown

Pipe Line Cleaner

Brenholdt, I. R. (assigned to Standard Oil Co.) PIPE LINE CLEANER AND LOCATOR. U.S. 2,601,248 (1952) June 24.

This invention relates to a device for locating pipe line scrapers in a pipe line. It comprises a rotating permanent magnet or an electromagnet oscillating at low frequency which is attached to the scraper, and a signal receiving apparatus designed ot convert the electromagnetic impulse to an audible, visible or recorded signal. O. T. Bloomer

Pipeline Tapping

Wright, P. PRESSURE CONTROL EQUIPMENT DESIGNED FOR USE ON 16-IN. GAS PIPELINES. *Gas*, 28, 94-100 1952 (July): *World Oil*, 135, 256-257 (1952) August.

Detailed statistics are given of the assembly and installation of a tapping machine with shut-off plug. El Paso Natural Gas Co. devised this to prevent service interruptions on its 16-in. high pressure (100 psi) line when it was necessary to relocate its main line through the city. D. C. Gami

The following article, the abstract for which appears on page indicated, is also called to your attention:

Klein, N. LEAK DETECTION WITH RADIOACTIVE TRACERS. p. 171

12. MATERIALS OF CONSTRUCTION

Aluminum Pipe Line

Wanderer, E. T. and Sprowls, D. O. ALUMINUM ALLOYS FOR OFFSHORE PIPE LINES. *Corrosion*, 8, 227-233 (1952) July.

This article discusses the construction and subsequent performance of an aluminum pipe line laid in Matagorda Bay, Texas, for use as a high-pressure gas gathering line. The results of a corrosion test program studying aluminum pipe are also discussed. B. E. Hunt

Corrosion Control

McConomy, H. F. and Hur, J. J. METALS AND COATINGS TO COMBAT CORROSION. *Petroleum Eng. Reference Annual*, 24, C28-C30 (1952) July 15.

The cost of repairs of steel refinery tanks exposed to high-sulfur oils is considered in the light of comparative costs of five alternative types of protective or replacement materials. An example of cost breakdowns and "break-even" life of material is presented.
O. P. Brysch

Moyer, M. I. and Hersh, J. M. (assigned to Cities Service Oil Co.) METHOD OF INHIBITING HYDROGEN SULFIDE CORROSION OF METALS. U.S. 2,602,779 (1952) July 8.

It is claimed that by introducing diethyl thiourea at the well bottom, metal equipment could be protected from the corrosion action of oil-well brines containing sulfur compounds. The inhibiting action of this compound is not fully understood, but a thin film is built upon the metal and this film is resistant to mechanical abrasion or chemical reaction. About 15 to 250 parts by weight of diethyl thiourea per million parts by weight of brine will give satisfactory protection. D. C. Gami

Patterson, B. VIGILANCE UNDERGROUND. *Corrosion*, 8, 142-246 (1952) July.

The need for control of corrosion on underground metal is explained and elements of planning electro-chemical control outlined. Principles of weighing dielectric control with economics are given and limitations and sequence of recommended dielectric tests are listed. A survey of common specifications and inspection fundamentals is followed by recommendations concerning electronic inspection after lines are in service. Authors' Abstract

Gas Main Protection

Kulman, F. E. CORROSION PROTECTION FOR NEW YORK CITY'S MAINS. PART II. *Gas*, 28, 37-41 (1952) July.

This concluding installment explains the test run after the corrosion protection installation and has the results of the survey. B. G. Lang

Hot-Corrosion Resistance

Blank, H. A., Hall, A. M., Jackson, J. H. BEHAVIOR OF SUPERHEATER TUBING MATERIALS IN CONTACT WITH COMBUSTION ATMOSPHERES AT 1350° F. *Trans. Am. Soc. Mech. Engrs.*, 74, 813-819 (1952) July.

Results of field tests of various metals exposed to combustion atmospheres at 1350° F. are presented. The low-sulfur coal and gas produce combustion products which are mildly corrosive while high-sulfur, high-alkali, and high-vanadium fuels produce highly corrosive atmospheres. Exclusive of considerations of strength and resistance to internal corrosion, a variety of metals are available for this application. AISI 3095, 310, and 314 show best resistance to general corrosion and subsurface attack.
B. E. Hunt

Plastic Applications

Black, G. H. PLASTICS IN CHEMICAL PLANT. *Chemistry and Industry* (British) 727-734 (1952) July 26.

A general discussion and tabulated properties are given of eight plastic materials available in Britain for use as linings or structural material for vessels which handle corrosive chemicals. Certain materials,—polyvinyl chloride, "Keebush", and graphite,—and their applications and fabrication are discussed in detail.
O. P. Brysch

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